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Rail Road News.

What 1849 has done in Railroad Building.

At the close of the year 1848, there were 1,614 miles of railroad in operation in New York, and on the 1st of December, 1849, there were 2,133, showing an increase, in eleven months, of 510 miles. By the first of January 1850, there will be about 150 miles more in operation, which will make the aggregate length 2,283 miles, and the total increase 669 miles. In the State of New York there has been an increase of about 400 miles. In the Southern and Western States, a great many miles of railroad have been opened this year, so far as our recollection at this moment extends, the total number of miles of railroad put in operation in the United States, during the year 1849, will not be less than 2,000. At the close of the year 1848, it was estimated that there were 6,120 miles of railroad in the United States; to which add the 2,000 opened this year, and the aggregate at the close of 1849, will be 8,120 miles.

Hudson River Railroad.

This road has now been in operation to New Hamburgh a little more than two weeks, and we understand is doing a fine business. At first the cars ran over the new part of the track above Red Hook cautiously, until its solidity and firmness at all points could be tested. But now the track is in fine running order, and the cars generally run at the rate of 35 miles per hour, which will be gradually quickened into still higher speed. The work between Poughkeepsie and New Hamburgh is now driven ahead with great rapidity, the track is nearly all laid, the buildings are getting in readiness, and we shall be surprised if the locomotive is not there within two weeks at the farthest.

Model Railroad.

It is said that the Albany and Boston Railroad Company have not paid out during the last year one dollar for accidents on their road. The business has increased by more than $10,000, notwithstanding the sickness of the season, and the consequent diminution of travel.

Caution to Persons in Railroad Cars.

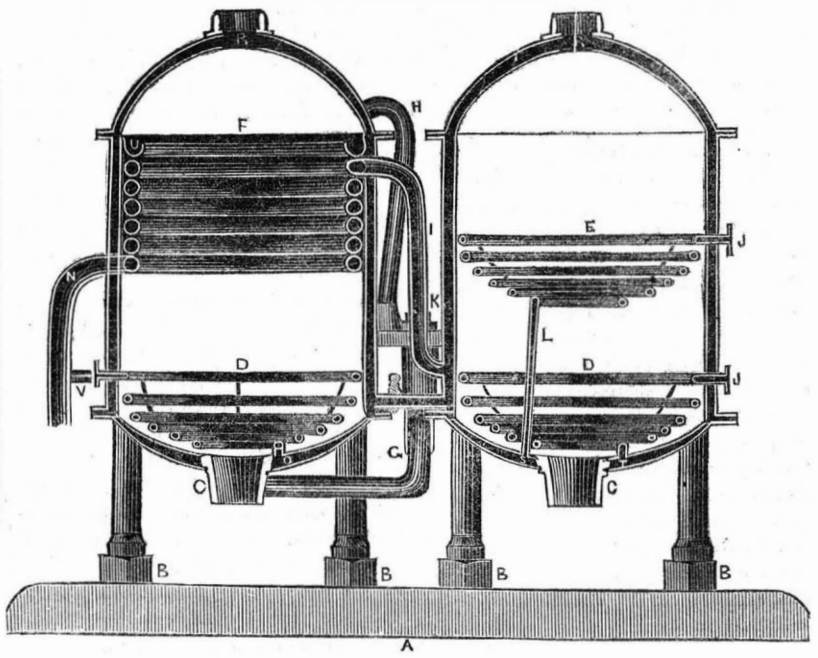
A young lawyer named Andrews, belonging to New Haven, recently lost his life in the following manner:—While standing on the platform of an outward train he incautiously thrust his head so far beyond the car, that it was struck by an inward train which was passing. He was thrown off between the trains, was seriously injured, and narrowly escaped instant death, but was taken to the Hospital, and died next day.

Cayuga and Susquehanna Railroad.

This railroad has been opened, and the cars are now running between Ithaca and Owego, N. Y., on a good road, and passengers can go from Cayuga Bridge, to come to this city, New York, by the Erie Railroad.

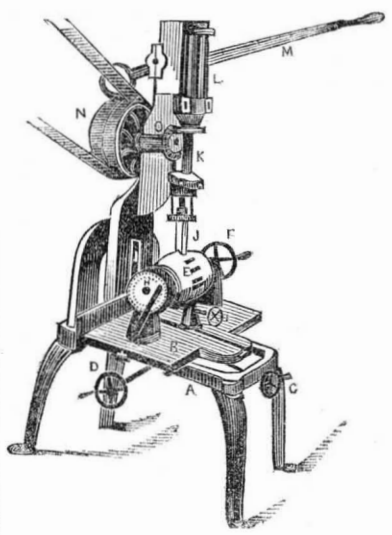
The London Times believes that Whitney's Pacific Railroad project is a grand and simple scheme.

IMPROVED APPARATUS FOR EVAPORATING IN THE SUGAR MANUFACTURE.



This is a patented invention of no small utility, belonging to Messrs. Benson & Day, of Water street, Brooklyn. Its principal feature is having the vacuum pan double, or with a jacket, to prevent the vapor condensing on the inside and dropping on the sugar, so that the sugar is made purer, and the evaporation is conducted at a temperature all of 20° less than by any other. This engraving is a vertical section, showing the whole interior. A is the floor; B B are the posts or legs of the pans, which will be observed are two cylindrical chambers—the right, the finishing, and the left the preparatory, with hollow spherical tops and bottoms. C C are two large bottom openings with close valves on them or proper cocks; D D are coils of pipe, heated by steam; E is another coil of steam pipe, in what is called the finishing pan, which, by the pipe L, lets steam into the hollow steam tight bottom, at S. The lower coil also communicates with the double bottom at T, and out at the back part. Between the outside case or jacket and the inside pan, is a chamber, R, in each pan. This is for the purpose of preventing the vapor condensing upon the inside surface, and dropping on the sugar. Sugar made in this pan; E, is therefore rendered very pure. The steam is let in by the branch pipes, J J, of the finishing pan, and by the small branch pipe with the flange, at the left hand of the preparatory pan N is a pipe to which the air pump is attached. It communicates with the coil of pipe, F, in the preparatory vacuum pan, which coil of pipe communicates with the chamber, R, of the finishing pan, by the pipe I. The vacuum produced in the pan E, is done by the air pump exhausting the warm vapor out of the finishing pan through the pipe, I, and through the coil of pipe, F. This last coil of pipe is therefore somewhat hot, and the juice is kept continually tricking over them from a trough, U, on the top—the juice being continually pumped into it from a receptacle below, as it falls down, by a pump, K, at the back part, drawing the juice repeatedly through the pipe, G, and pumping it in by the pipe, H; V is a small branch pipe of the air pump, which is (but not shown) connected with the chamber, R, in the preparing pan, to produce the vacuum in it. There are other arrangements about vacuum pans not shown here, such as how the juice is conveyed in, &c., but the new and principal parts are pointed out, so that sugar manufacturers, will at once see the real utility of this invention. The finishing pan may be used in combination with the other or not, as manufacturers may choose, but we would advise the use of the two combined.

Swingle's Patent Mortising Machine.



This Mortising Machine was invented and patented by A. Swingle, formerly of Texas, now of Boston.

A are the legs; B the bench; C is a set screw for the out and in movement of the bench, and D for the lateral movement, for any kind of work; E is a hub to be mortised; it is mounted on centres, turned by the handle, F, and there is a retaining ratchet and wheel, H, on the nigh side. There is a rest below the hub, operated by a steadying set screw, I. J is a hollow augur. The augur inside receives a very rapid motion from a bevel wheel, O, gearing into a pinion which drives the spindle, K, of the augur. N is a pulley to drive the wheel, O. M is a lever, fitting into the shoulder, L, and by flanges the spindle is made steady to the back of the frame, works down in guide collars. When the hub, or whatever it may be, is in a correct position, the spindle, K, of the augur is set in motion, and the operator gently brings down the weighted lever, M, cutting out the rectangular mortise. There is but little work for the outside chisel of the augur to perform.

The lever rests on the top of the spindle, and it (the spindle) works by feather and groove, to run down through its gear pinion, to follow the cut to the bottom of the mortise.

Useful Receipts.

Butter Preserved by Boiling.

A physician who has travelled through Switzerland describes a process of preserving butter as adopted in that country, and which he states to be far preferable to the English plan of salting. The process is as follows:—Into a clean copper pan (better no doubt tinned) put any quantity of butter say from 20lb to 40lb, and place it over the fire, so that it may melt slowly, and let the heat be so graduated that the melted mass does not come to boil in less than about two hours. During all this time the butter must be frequently stirred say once in five or ten minutes so that the whole mass may be thoroughly intermixed, and and the top and bottom change places from time to time. When the melted mass boils, the fire is to be so regulated as to keep the butter at a gentle boil for about two hours more; the stirring being continued. But not necessarily so frequent as before.

The vessel is then removed from the fire and set aside to cool and settle, still gradually. This process of cooling is supposed always to require about two hours. The melted mass is then while still liquid, to be carefully poured into the crock or jar in which it is to be kept. In the process of cooling there is there deposited a whitish cheesy sediment, proportioned to the quantity of butter, which is to be carefully prevented from intermixing with the preserved butter. The caseous grounds are very palatable and nutritious, and are constantly used as food. Butter so prepared will last for years perfectly good without any particular caution being taken to keep it from the air, or without the slightest addition of salt.—[Globe.

[This plan of curing butter has been practised by some of the Tartar tribes for centuries. Two weeks ago a claim for a patent to Mr. Merriman, of Ill., appeared in our columns to accomplish the same object, but by very different and more simple means.

Butternut Catsup.

Gather the nuts about the last of June or first of July, and when they are almost fully grown, but still green and so tender that a pin can be easily passed through them. Throw them into boiling water for a minute or two, and then wipe them with a coarse cloth to remove the clamy down that covers them (Some persons omit this.) Then put the nuts into brine, made by saturating cold water with salt, and let them remain there fourteen days, after which soak them in cold fresh water twenty-four hours, and then put them, together with three whole lemons to one hundred nuts into the earthen jars wherein they are to be kept. For every hundred of the nuts take one gallon of pure cider vinegar, and one ounce each, of whole black pepper, allspice, cloves, and rasped ginger; boil these together, and pour the hot liquor and spice over the nuts, cover the jars, and tie them close. They should not be opened for use less than a year.

Animal and Vegetable Chemistry.

Frenisus found about 1,3,000,000 carbonate of ammonia in the air of the day, 1,2,000,000 in night air. Liebig has lately discovered that the composition of the inorganic part of the blood, of urine, and of the aqueous extract from meat, are most strikingly similar and that the whole character of the blood can be changed at will, and that in a very short period, by change of diet—such a variation as implies a material change of character, as, for instance, the replacement of its alkaline phosphates by carbonates.

There is one paper printed in the English language in Paris.

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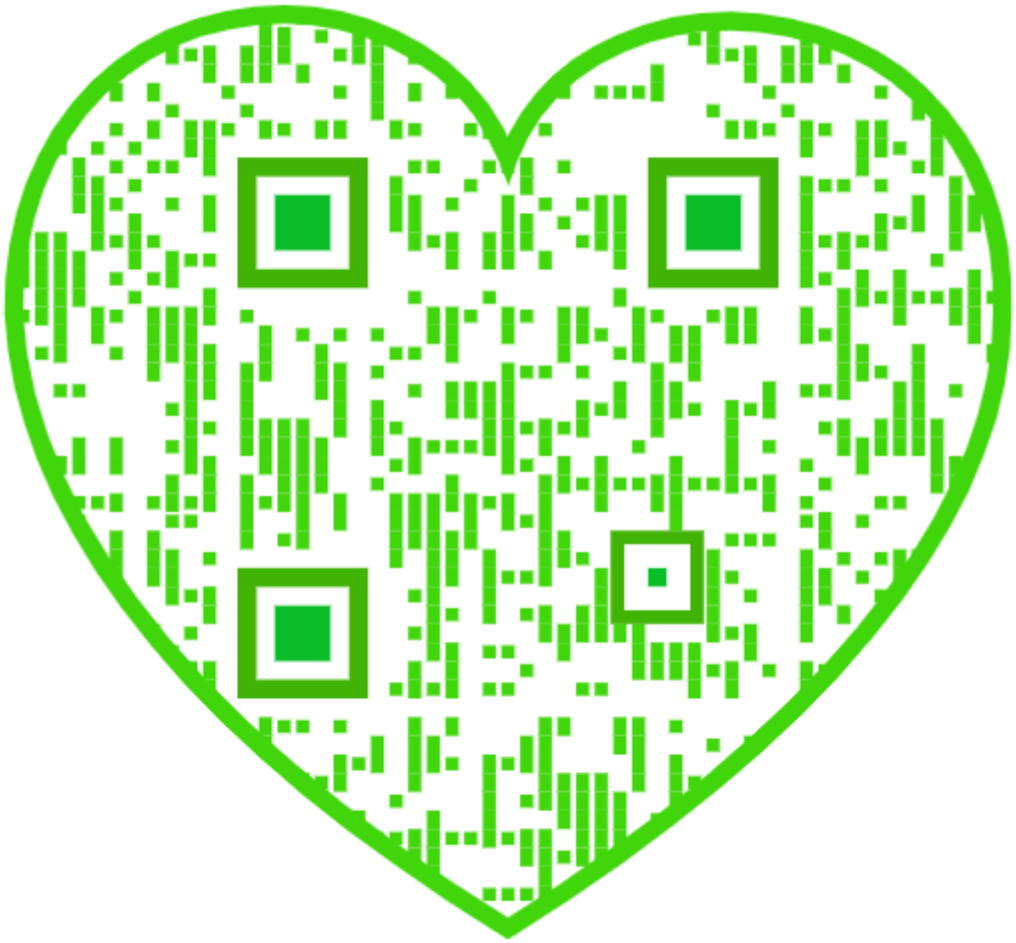

Miscellaneous.

Correspondence of the Scientific American.

WASHINGTON CITY, Dec. 23, 1849.

As the struggle for the Speakership is now over, and the Car of Congress on the business track, I trust that the train will be put through by daylight. Owing to the long delay in the organization of the House, the applicants for office have been subjected to great inconvenience and expense. On conversing with many of them I find that they have left a sure though moderate business at home, for the purpose of coming up to the Metropolis to try their chance in the political lottery. This is the rock on which they have been wrecked. It was the advice of plain old William Cobbett, "Stick to the shop;" I hope therefore that those honest mechanics who have been deluded by deceptive promises to leave their benches and hammers, in the hope of getting a desk at Washington, will forthwith return home and *continue* to be respectable and useful members of society. I perceive that a "Yea and Nay" telegraph has been put up in the Pennsylvania Legislature. Such a machine has been frequently brought before Congress, but the members do not feel comfortable at such an idea—they may have fears that the next invention brought forward, will be for them to stay at home, and make their speeches and do their voting by telegraph.

A heavy consignment of the new double eagles have arrived at the Treasury Department for the payment of officers. A good result of coin of a large denomination is, that it leads to economy—the possessor does not like to exchange them. The gold dollars are much sought after—they are certainly much better for the workingman than plasters. The great influx of California gold may have a tendency to advance the value of real estate; and it may have a tendency, an injurious one, of inducing a luxurious mode of living, with all its attendant evils. The precious metals imported from Mexico to Spain, produced lamentable results—it is our duty as a people not to follow their example. *

Profits of Public Slaughter Houses in France.

In all cases where these have been built in France, the revenues have been such as to make such constructions good speculations. At Paris, in 1847, the gross revenues were 1,200,000 frasnc, nearly; the expenses, including employees, repairs, water, lighting, &c., were not 140,000 francs, leaving 1,060,000 francs.—In the town of Havre, the abattoirs (slaughter-houses) are built upon 18½ year leases, and yet the proprietor makes money by his speculation. At Caen, the abattoirs produce a net revenue of 24,000 francs to pay the interest of a capital of 301,000 francs. Everywhere the results are about the same; nor can there be any reason to doubt that in America the results would be equally favorable. The butchers of Paris, at first, violently opposed the establishment of the abattoirs; but now they are so convinced of their utility and commodity, that they would almost as vigorously oppose any return to the former system. Indeed, it must evidently be to the interest of the butcher that his meat be killed in the most perfect condition, to insure its preservation, and to satisfy the public that every precaution is taken to insure a supply of wholesome meat.

Cotton Experiments in Australia.

An experiment of half an acre of land has been tried with cotton seed at Maitland, Australia, which is thus described by the Maitland Mercury:—"About the 7th of September, 1848, the seed was sown as it was obtained from the government gardener at Sydney. They were planted much in the same way as Indian corn—two seeds in each hole, the holes three feet apart, and four feet between each row of holes. In a few cases both seeds germinated and grew, but in the great majority only one plant appeared above ground, while in a few cases both seeds have perished. Shortly after the plants appeared, they were attacked by a grub, which at first threatened to destroy the crop, but passed away without doing serious damage. The young cotton crop continued to grow steadily, and in due time flourished vigorously, the plants attaining a general height of from three feet six inches to four feet, and many reaching to five feet high, branching out into bushy plants, and bearing perhaps on an average 30 pods, some being much less, and others reaching 50 pods; and it was remarkable that the hot winds of the season, some of which have been unusually scorching, produced no apparent effect on the cotton plants, not even making the leaves flag for the time. The plants appear to continue in flower for a long time, or at least these have done so, and at the present time when the earlier flowers have changed into pods, and a few are here and there bursting open and showing the cotton wool within; there are still a large number of flowers in bloom on different plants, in their various shades of white, yellow and pink.

Chocolate and Broma.

Broma, an admirable preparation, alike agreeable to the well or sick, has acquired a reputation which we think it certainly deserves. A few years since, a great manufacturer of broma, Mr. W. Baker, of Dorchester, Mass. sought the opinions of medical gentlemen of distinction, for the purpose of having an unobjectionable food for invalids, and he was assured that he had fully succeeded. Hospitals infirmaries, and households generally, should always be provided with it. When gruel, arrowroot, barley, starch, rice, farina, and many other things ordinarily resorted to for patients, are of no utility, broma is sometimes relished. It is believed that those who use it as a daily beverage will have manifest dietetic advantages over the consumers of tea and coffee. We see it stated that during last summer, those individuals who were habitually using chocolate or broma, neither had attacks of cholera or dysenteric affections, while others in the same families, taking their daily potations of tea, coffee, or simple cold water, were the sufferers, if any. We cannot vouch for the truth of this but it has recalled to mind the statement that the oil dealers in London have been free from cholera or the the choleroid symptoms. And it has been farther observed here in Boston, that persons who were taking codliver oil for chronic difficulties during the prevalence of the late epidemic, were not effected by it. Vegetable oil in the first instance, and animal oil in the last, taken internally, would appear by these statements to have secured those who took them from the shafts of the pestilence. It is certainly a point, well worth while to determine, whether the chocolate drinkers, have been secure in other infected cities.

[The above is from the Boston Medical Journal. We must say that all the Bromas and and what not, that we have ever tasted, have not been able to make us fall out with our favorite coffee. Many things have been the means of preventing cholera, so many indeed, that it is a great wonder that any persons took it, those who did, surely, were not acquainted with Broma.

Definition of the Universe.

Baron Jach, an eminent astronomer, computes that there may be a thousand millions of stars in the heavens, and then, to illustrate or describe the immensity of the universe, he says:

"If we suppose each star to be a sun, and attended by ten planets, (leaving comets out of the calculation,) we have ten thousand millions of globes like the earth within what are considered the bounds of the known universe. As these are suns to give light throughout all these systems, we may infer that there are eyes also to behold it, and beings whose nature, in this one important particular, is analogous to our own.

"But even this is exclusive, probably, of millions of suns, bosomed in the unknown depths of space, and placed forever beyond our ken, or the light of which may not have had time to travel down to us since the period of their creation."

But this is not a very satisfactory illustration; for "what are his one thousand millions of stars and ten thousand millions of globes, with the uncomprehended and incomprehensible numbers that actually exist?"

The best definition of the universe, says the Washington Globe, and one that can never be improved, has been given by Pascal, whose fame is so great and so well deserved as an able eloquent, and intrepid advocate of Moral and religious truth, against error, intolerance, and imposture; and as a man profound in science and in the learning of his day as he was, he is comparatively little known. His definition is, that the centre of the universe is everywhere and the circumference of it nowhere; which is at once astronomically exact and unimprobably concise and elegant:

"We will proceed to illustrate this. Our planet, the earth, for instance, is a centre, according to Pascal; then we will imagine a point so remote from us that a telegraphic despatch, conveyed at the rate of nearly two hunthousand miles per second, would not reach it in less than ten milions of billions of years, expressed in figures thus: 10,000,000,000,000,000,000,000. Now this inconceivable remote point would be a centre also, and any other point a million times as remote; but the circumference is not even approached in any degree, for there is none.

"No matter what may be the magnitude of a thing finite in its nature, and circumscribed by limits, and metes, and bounds, it cannot constitute even an atomic portion of what is its nature infinite, and which is circumscribed by no limits. Therefore, the whole solar system, or the whole of the universe itself, as far as the telescope has reached it, will not bear as great a proportion to the stupendous whole as one drop of water would bear to all the water, fresh and salt, on our globe.

"Baron Jach, or his commentator, says that 'there are suns placed so far beyond our ken that the light of them may not have had time to travel down to us since the period of their creation?

"To this we subscribe, omitting the word "down," which is not astronomically used; for there is no up or down in the case. Those suns are so much "down" to us as we are to them. And we will add, that whilst there are stars or suns whose light has not yet reached us, there are others whose light can never reach us, supposing no obstacle to its transmission, except distance.

"To illustrate further the total absence of any kind of proportions or relations between things finite and things infinite, it may be observed, that a million of billiens of years, which would be a period of time utterly inconceivable by human faculties, is certainly not the smallest appreciable or conceivable part of eternity; the proof of which is, that an immortal being, having arrived at the end of that term, would be no nearer the end of eternity that he was at the beginning of the term. He would have made no progress whatever, nor can any be made."

Fattening Animals.

A memoir was read to the Academy of Sciences, at Paris, by MM. Dumas, Boussingault, and Payan, "Of researches on the fattening of animals, and on the formation of milk." These philosophers announce their belief that fatty matters are formed in plants alone; that they thence pass, ready formed into the bodies of herbiviri, entering the chyle duct by the lacteals, and so passing into the blood; that the first degree of oxidation forms stearine or oleac acid; a further degree produces the margaric acid which characterizes fat; a still further degree the volatile fatty acids—in opposition to Liebig, who traces the origin of fat to the sugar or starch of the food. In confirmation of their views, they show that hay contains more per cent, of oleaginous matter than is produced in the butter from a cow fed on this hay; and that cows fed on roots, poor in fat, produce much less butter. They advance an influence, which bears much on rural economy, that a cow eliminates twice as much fat from a given quantity of food as does an ox; and hence the commerce of milk and butter deserves a high degree of attention. Some relative experiments on fattening pigs bear out the same general principles.

The Cholera Expenses of New York City, for 1849 were, $55,372. The expenses in 1832 were no less than $117,687.

Holden's Magazine.

This popular cheap publication has appeared to us in a new dress and commences the New Year much improved. Among its contents for January is a portrait of C. W. Holden, deceased, who was founder of the work, accompanied with a biography of him. Mr. H. was a generous, upright and persevering young man, and his loss is lamented by all that ever knew him, especially by those who best knew him.

The Magazine is to be conducted in future by Wm. H. Dietz, Esq., and to retain the name that has characterized it as the best monthly ly Magazine at a dollar a year, published in America. Bound volumes of the last year's numbers are new ready and for sale at $1,50—each neatly bound in gilt. Office of "Holden's Magazine," 109 Nassau street. Subscription price $1 per annum: published monthly.

Spirit Drinking in Great Britain and Ireland.

From the excise returns, just issued, the following sumary of the consumption of spirits in the three kingdoms, for the half year ending 5th July, is taken:—England, 4,107,000 gallons; Scotland, 3,239,000; Ireland, 3,091,000 gallons; total 10,437,000 gallons—giving an annual comsumption to each individual of the population according to the census of 1849 of, in England. 4 pints, Ireland, 6 pints; Scotland, 20 pints.

[This shows that Scotland drinks five time more whiskey than England, in proportion to the inhabitants, and more than three times that of Ireland. It is deeply to be regretted that the clergymen in Scotland take so little interest in arresting the evils of intemperance. There are no emigrants that come to this city who are so liable to get drunk as the Scotch, and there are none, we believe, so intellectual, intelligent, and more highly respected than the moral class among them. Intemperance is fast destroying their moral character. We hope that this will reach the heart of many in that country.

News from California.

The Empire City arrived here from Chagres on Christmas morning. She brought news of an enormous rise in the price of provisions. The laborers had struck for $10 per day; they formerly got $8. The elections have taken place and have passed off, as among ourselves, with animation but quietness. Great numbers are glad to get back, and are coming as fast as they can, and as they are able. Many who were in good situations in this city are playing heavy tragedy to masons, viz., carrying the hod. It may do them no harm, because it is very honorable, owing to their being better paid than for members of Congress, namely $10 per day.

Fire and Storm.

Last Saturday was one of the most stormy days ever experienced in this city. A number of houses in the course of erection, were blown down and a number of vessels have been wrecked on our coast. The large Sugar Refinery of Messrs. Woolsey on the East River, took fire and was entirely consumed. About 200 men have been thrown out of employment. The loss is about $600,000. This large work was well prepared for fires, having the water in every floor, but all was in vain to arrest the destroyer.

A Fact Worth Remembering.

The best method to sell Patent Rights or to bring an invention into notice is to have an engraving or description of the same published in the Scientific American. The expense is but trifling and the benefits derived are manifold. Hundreds of thousands of dollars' worth of patent rights and machinery have been sold by publishing descriptive engravings of inventions in the Scientific American, and it is not too late to make more fortunes in the same way.

The great coal field at Ballycastle Ireland, has been opened by an English Company. It may be said, that the whole manufacturing and other improvements in Ireland have been commenced either by English, or Scotch companies.

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For the Scientific American.

Against the Crank.

MESSRS. EDITORS—In No. 1 of the present Vol. of your paper, you published a communication from me, in which I said that notwithstanding all "the contempt and ridicule heaped upon those who dared question the soundness of the belief that the whole power of the steam applied to the piston is, through the medium of the crank, faithfully transmitted to produce a rotary motion of the shaft." I am still unconvinced of its truth. In the same communication I further said, "From much observation and conversation with the most celebrated engineers and engine builders in this city, I boldly venture the assertion that you cannot get any three to agree in their answer to the following simple question: What is the average lever of a crank four feet long?" I then solicited "an answer through the columns of your valuable paper, from yourselves, Messrs. Editors, and three others, viz., from the Novelty Works, Secor Works and the Allaire Works."—In conclusion I said, "In return for the trouble given in answering this simple question, (which I consider as lying at the very foundation of the crank engine,) I promise, when answered, to give my answer to it, and to show, by comparison, that the ownly high lauded crank is a very inefficient, bungling and wasteful contrivance." At the bottom of that communication you appended the following editorial remarks: "Mr. Pulley is not content with the old scriptural plan of having a matter established by the mouth of two witnesses, he must have four. As he has 'fought and conquered ere a sword was drawn,' it may be difficult to find opponents to measure swords with him, especially, when he tells them that for the trouble of answering his questions, he designs to pay them back with three extinguishing thrusts from his *unconquerable blade*. Nevertheless, we will publish an answer to this, if it comes in courteous language, is brief and clear, &c,"—but did not yourselves, as respectfully requested, answer the question (not questions) as erroneously represented in your remarks.

In the next number (2) of your paper, a writer from the Allaire Works, over the signature of "Pinion," notices my communication, and amongst other things says: "The only ridicule that has been heaped upon those who dared question this truth, was of their own production—the numerous bungling contrivances which they have brought forward as substitutes for the crank—they alone have sat and do sit, in the chair of the *scorner*." Again he says: "the friends of the crank have too much good sense to get out of a circle to reason—they leave that kind of metaphysics to their opponents, and if they are content to revolve on their toes, whirling round on the outside of the circle, or fly off at tangents, good and well." And again: "The great difference between the *modus operandi* friends of the crank and their opponents, lies in this—the crankites can whirl round in their circle and cleverly whisk over the dead power points,—whereas the anti-crankites, by traversing outside of the circle, either go down head foremost at the lower point, or get transfixed at the upper one—like the western horse that was found sticking to a rock of loadstone." What is this but "contempt and ridicule" heaped upon the opponents of the crank? Is this mode of treating an important subject calculated to promote the "advancement of truth—to elicit something new?" But does he answer my simple question? He does not. Hear what a lame and impotent excuse he gives for not answering it. "As it regards the leverage of the crank, it would be more than weakness to answer him,—there can be no *two* opinions among enlightened engineers on the subject, and to do justice to the friends of the crank on this point, it would require a diagram for explanation!" Now, Mr. Pinion, if my question is really so very simple that there can be "no *two* opinions among enlightened engineers on the subject," as you observe, why not answer it? Answer it, my man; I did not ask for, nor do you need a diagram for this purpose. The question was in the following words: "Its extreme working length being four feet, what is its average length (expressed in inches) towards rotation, during one revolution of the shaft?" You see it is its average length, expressed in inches (not a diagram) that I called for. The question is, indeed, a very simple one; so simple, in fact, that any boy understanding the elementary rules of common arithmetic can hardly fail to give a correct answer to it; and yet among "the most celebrated engineers and engine builders in this city," amounting to several hundreds (not four) in number, my assertion stands good that you cannot get any three to agree—agree? Worse than that—to answer it at all! When it is answered by the persons, to whom it was addressed, and from whom I again solicit an answer, I will redeem my promise, or, at least, endeavor to do so. PULLEY.

[We publish the above out of courtesy to the author, but he has sent us another communication in answer to Mr. Tobey, which we cannot publish—its language is too personal and uncourteous. Mr. Tobey did not appear on the stage in the attitude of a wrangler, but merely stated his own experience—sincerely for the benefit of others. Mr. Pulley should know that editors do not allow their correspondents to act the part of inquisitors, and that the Scientific American is not a gladiatorial amphitheatre. It would have been well if he had taken the advice of Pinion, and opened the debate on the subject of his own choosing. Courtesy should have taught him this, and if he has not got an answer as requested, it is owing to the respect which the challenged have had for themselves.

For the Scientific American.

Patent Laws.—Re-Issues.

GENTLEMEN—As the contents of the Address of Geo. Gifford, Esq., on the Patent Laws, delivered before the American Institute at the recent Fair, at Castle Garden, has been the subject of much interest; I, as one who have been accustomed to reflect much upon the advancing progress and proud developments of art and science, and who in common with other citizens, feel an interest in encouraging and guiding the genius of men by proper laws, beg leave to express my gratification, that you have rendered the effective aid of your Journal in giving publicity to some of the many important things contained in that Address, and have manifested a determination to have them fully understood. I refer to your call upon the Patent Office, for information, found on the 75th page of your paper of the 24th of Nov. last, and to your more urgent call, accompanied with extracts from the Address, contained on the 73d page of your No. of Dec. 9th, 1849.

A more important matter, connected with our system of Patent Laws, than that of the re-issue of Patents, as presented and dissected by Mr. Gifford, in his Address, and thus, by you, kept before the public for consideration, can not occupy the attention of Congress.

Mr. Gifford states on page 21 of his Address, that "the practice of the Patent Office, in granting re-issues, has been, not to limit the extent of the claim of the new patent to the invention appearing in the original patent, or to be inferred from the specification annexed thereto, but to enlarge it on *ex parte* evidence to any additional extent." He then follows up this statement by a full and clear exposition of the fraud, deception and almost endless mischief and ruin to which such practice is calculated to lead.

As to whether such has been the practice of the office you have seemed to express some doubt, and have called for information as above mentioned.

I have waited in expectance, supposing that the officers of the Patent Office would comply with your reasonable request, but finding they have not, and deeming this a matter of great public interest, I beg leave to add, that since the publication of the Address I have ascertained from proper examinations that it has been the practice of the Patent Office to grant re-issues for more than appeared in any manner in the model, drawings or specification on which the original patent was granted.

In making this statement I do not intend it as alleging a wrong against the officers of the Patent Office, on the contrary I have been credibly informed, that they deem the practice a bad one, but have considered themselves constrained to it by the decision of the Courts, construing the statute. Nor do I, by any means, intend to be understood as assuming that the statement as made by Mr. Gifford, required corroboration, as it is not to be supposed, that one occupying his position, would make an assertion, involving so important a matter, without being certain of the fact. My object in adding my testimony to the fact, as stated by him is to avoid, as far as possible, the subject being passed over under a supposition that there may be some mistake as to such being the practice.

There is another part of the law and practice, in granting letters patent, also stated and condemned in Mr. Gifford's Address, which results in evils kindred to those coming from the present practice in granting re-issues. It is the granting of patents for old inventions for an indefinite time after they are made, and after others have obtained patents covering them.

This practice runs thus:—A makes an invention, procures a patent, involves the capital of others in it, by selling a part, and with much trouble gets it into successful use and operation. By this, and some years thereafter, B is reminded that many years before, he experimented (and perhaps in secret) on a thing like the whole or some part of the invention patented by A, and though he had laid it aside and scarcely thought of it since, nevertheless, being the first inventor, he applies for a patent. The Commissioner of Patents declares an interference between his application and A's patent; testimony is taken, B proves that he was the first inventor so far as to put into practical form and use as an experiment, and takes his patent.

Now the result of this is that A, and the parties who have become interested with him in his patented invention, as well as those who have purchased the patented article must suffer. The result which Mr. Gifford proposes against such consequences, which I regard as a wise one, is, that B should not be entitled to a patent "unless applied for within two years after the completion of his invention."

Now I would ask, if old experiments are to be thus called up from oblivion and patented in defiance of the rights of others who have subsequently made the invention and patented it, and old patents are to be expanded by re-issues, to take in inventions of others, made and patented subsequently to the date of such old patent, where is the security of the inventor in making and introducing his invention, and where is the safety of the public in procuring rights from patentees, or having any thing to do with them? There is none whatever, and the grand object of the system is defeated by bad details.

I had intended to set forth more in detail the evils of such practice, but fearing I shall take up more room than the demands of other important matters with which your journal is weekly filled, would entitle me to, I must desist for the present, and therefore will refer your readers to Mr. Gifford's Address, for this, as well as many other things of general and great importance.

The American Institute published the Address, and copies can be had at their rooms, as I am informed. OBSERVER.

Dec. 17th, 1849.

Naturalization of Females.

Many women who come from Europe and intend residing permanently in the United States, think, as they cannot expect to vote, there is no use of their becoming naturalized; but this is a very serious mistake. By the law the property escheats to the State, and it is the duty of the attorney general to see that estates which would descend to the wife, if she was a citizen, are taken by the State. Previous to the year 1845, public informers could draw the one-eighth of property informed of thus seized, but by change of the law this is no longer the case. It is now left in the power of persons who are at enmity with a widow thus to inform and have her all taken away. Of course, cases of this kind are few; the widow is usually allowed to enjoy property unmolested, but she cannot make a title to it, and if she attempts to sell, or when she dies and her heirs dispose of her estate, litigation almost certainly ensues, and on examination the State seizes their property in dispute. Cases of this kind are constantly occurring; thousands of dollars are thus lost annually, and all women not naturalized should become so at once.—[N. Y. Tribune.

[It is high time that such a law was abolished,—it is neither a just nor a wise law. There are thousands of foreign bond holders who are content to drain away the interest of their money and expend it abroad, because they will not buy fixed property with the threat of their children losing it, because they cannot, from some good cause, renounce allegiance to their native lands. We consider that such a law in other countries would be unjust to many American merchants. If such a law existed in England, we never would have received the splendid Smithson bequest. To apply the naturalization laws to females, is a touch of despotism fit for the Austrian or Russian governments, but not for Republican America.

Java Coffee and Pepper.

In extent Java is about seven hundred miles in length, and it varies from eighty to one hundred and forty miles in width. Its area is less than twenty thousand square miles. The face of the country is more or less broken by mountains, but the soil generally is rich and productive. The products are rice, sugar, coffee, pepper, spices, and a profusion of the finest tropical fruit. Coffee is cultivated to as great perfection as in almost any other part of the world. It grows upon large bushes, and the grains of coffee are formed two in a berry about the size and shape of our common plum. The skin of the berry is about as thick as that of the plum, and the color, when ripe, a pale scarlet.

The bush is very productive. Every branch is loaded with the berries, which grow two in a place, on the opposite sides of each other, and about an inch and a half apart. When ripe, the skin bursts open, and the grains of coffee fall out upon the ground; but a more general way is to spread something under the bush, and shake the coffee down. After the outer skin is taken off there remains a kind of husk over each kernel, which is broken off (after be- well dried in the sun) by heavy rollers. The coffee, after this needs winnowing, in order to be freed from the broken particles of the bush. It has been said by some writers that one bush will not, with another, average more than a pound of coffee.

Black pepper is also raised to some extent on the island of Java; but Sumatra, which lies just across the straits, is by far the most celebrated for this commodity. Her pepper is, perhaps, the finest and most abundant of any one country in the world. Black pepper grows on a vine, very much like our grape vine. The pepper grows, and looks, when green, very much like our currants. There is this difference, however, the currant has each its own distinct stem, but the pepper has not, every grain grows hard on to one common stem, just as each grain of Indian corn does on the cob.—The color of pepper, when first ripe, is almost a bright red, and changes to the dead black by being exposed to the heat of the sun.

The white pepper is nothing more than the common black, with the outer skin taken off.—It is first, soaked until this skin bursts open, which is then rubbed off and the grain dried. The white is not considered so pungent as the black, though it is nicer and more expensive, as more labor is necessary in order to prepare it.

Yankee Ingenuity.

A Liverpool paper states, as a proof of the increased civilization of the United States, that "no fewer than five hundred cases of Shakspeare's busts, taken from the monumental bust at Stratford-on-Avon, were lately shipped at Liverpool for New York." The truth is, however, that these casts are in lead, and as soon as they are delivered will be consigned to the melting trough. Jonathan admits "works of art" free of duty, and the lead importer, by invoking Shakspeare, nullifies the tariff upon that commodity.

Water has been let into the United States Dry Dock at Brooklyn.

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New Inventions.

Good Invention for Canal Navigation.

Mr. James M. Burdick, of Fort Ann, N. Y., has invented a most simple plan to prevent the horses of canal boats from being drawn over the bridges of rivers where the current is sometimes very powerful, when the boat is crossing. To say that he accomplishes his object in a most simple manner, is not enough to convey a true idea, nor notice enough of this good invention. It is well known that horses are often drowned from the causes stated, and the danger of those on board the boat is as great as that of the horses, when such an accident happens. It is not long since a boat was nearly carried over the lower falls of the Mohawk, below the Cohoes, from the cause stated—it was only by a most providential cirumstance that every person on board was not lost. With the invention of Mr. Burdick applied to every canal bridge crossing a river, no such accident can occur. The bridge is made with a cheap, but peculiarly constructed railroad—one rail at a greater elevation than the other; and on this is placed a small carriage, to run upon the rails. To the one side of it the horses are attached, and to the other the boat; and the horses draw the carriage on the rails along the bridge, and therefore the boat below. There are two horizontal wheels on the carriage, bracing opposite one another, on the sides of the rails, so that no drag of the boat comes directly on the horses. Measures have been taken to secure a patent.

Improved Smut Machine.

Messrs. S. S. Gouldthrite, of Lowville, and and Cyrus D. Gorden, of Martinsburg, Lewis County, N. Y., have invented improvements on the Smut Machine, which appear to render it perfect for the purpose intended. The grain can be conducted into it from any place in the apartment, by a spout, which conveys it to a central hopper, on the top of the machine.—This hopper has side slits at its bottom, and is secured on a vertical shaft, which has a pulley on it, near its lower bearing, which revolves it, and an interior chamber inside connected to it. This throws the grain between three circular descending fluted chambers joined together, where the grain is rubbed, the balls broken and the lighter coarser particles thrown out at slits above, by the wind of the revolving chamber spoken of, which has fans on its outside, acting the part of blowers. The wind is drawn in to holes at the bottom of the said revolving chamber; and on the outside of all is a finishing slitted screen or fluted curb, through the slits of which the finest dust is blown out, and the grain falls down pure and clean, into a proper receptacle below.

Measures have heen taken to secure a patent.

Good and Novel Invention.

A London mechanic has invented a small apparatus which he attaches to a common clock when he goes to bed, and sets it to free a lever, which rings a bell and lights a lamp by igniting a match, at any hour to which it may be set to awaken him. We are not yet sufficiently acquainted with its construction, but the idea at once conveys possibility of execution, and certainly it is an invention both convenient and exceedingly useful.

Build Your Railroad Bridges Strong.

A number of railway arches have lately fallen in England, causing much damage and expense; and we perceive by exchanges that a railroad bridge over a creek, near Covington, Georgia, was precipitated to the ground, a distance of 50 feet, when the train was passing over it. The conductor was killed and the cars smashed to pieces.

Great Rifles.

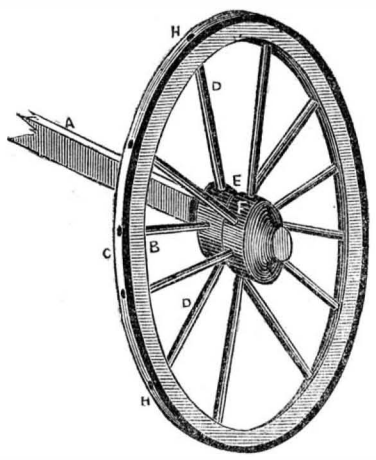
Next week we will describe the celebrated "*Breech-loading* Prussian Rifle," finely illustrated. It has been recently patented in the United States. It is quite an original invention.

A fine ancient statute of a Wrestler, has just been discovered at Rome. The foot is long and the limbs sinewy but thin. It is said to be a work of the Augustan age.

Improvements in Wagon Wheel.

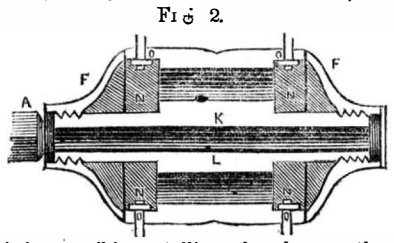
This is an improvement to fasten the spokes of wagon wheels and the tire, in such a manner as to obviate the evil resulting from the breaking of oblique set spokes, secured by nuts inside of the felloe. The inventors are Messrs. John C. & Geo. F. Fowler, of Newbury, Vt., who have applied for a patent. Fig. 1 is a perspective view of the wheel, &c., and fig. 2 is a vertical section, showing the inside of the hub, and how the spokes are secured in it. A is the axle; B is the felloe of the wheel; C is the tire; D D are the spokes. The spokes are set obliquely into the hub, which is made, as it were, of two distinct hollow boxes, E E: the one spoke alternately after the other, pass-

Fig. 1.



es into and is secured in the hub or boxes of it, making what is called a suspension wheel.—The hub is formed with a tube, K, extending through it, which is the journal box of the journal of the axle, seen in fig. 2. F F are two caps secured to enclose the ends of the hub. S S are two holes or orifices bored through the solid part, between the two chambers, E E. An end view would show a circle perforated with holes, but this section is cut through the said holes. The middle between the two chambers represented by N N, is solid, only it is perforated with the small holes: O O are nuts that secure the spokes in the inside of the chambers or compartments of the hub. The heads of the spokes (metallic) are fitted into the countersinks, H H, in the tire, and spokes are secured to any degree of tightness by the nuts, O O. It will be noticed that the tube or journal box of the hub has a screw on it at both ends, and the caps, F, have threads on them to fit. It may be supposed that it is absolutely necessary that there should be nuts on the spokes inside of the felloe, for the spring of the wheel. The inventors have found (as they have manufactured them) that

Fig. 2.



this is an evil in metallic spokes, because there is no room for the spring of the spokes and the consequence is, spokes often suddenly snap in two at the shoulder. Messrs. Fowlers allow room for the spring of the spokes, by securing them inside, only one nut for each, and they can use strong vulcanized india rubber washers inside of the nuts.

Salter's Iron Furnace.

A correspondent in the Newark Sentinel, N. J., thus describes Mr. Salter's Furnace, the claim of whose patent, appeared in our list three weeks ago.

"His Furnace is adapted to ores, yielding 40 per cent and upwards of Iron. It consists of a triple chambered Furnace, one above the other—the ore being pulverized and mixed with hard coal and ground fine is placed in the upper chamber—where the gases and impurities, such as sulphate, &c., are carried off at low temperature. From thence it is drawn through openings in the bottom, into the second or middle chamber, where the fluxing materials are added—thence it is drawn down openings to the lower or puddling chamber—the whole process occupying less than an hour and a half.

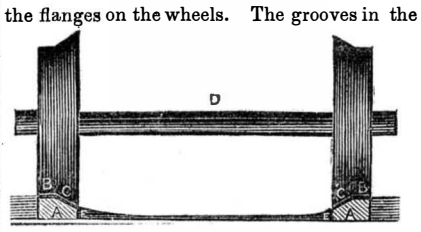
Five men are required each turn to work the Furnace, and the yield is about 400 lbs. per hour and a half. Two and a half tons coal are consumed in 24 hours. The cost of the Iron will vary according to the facilities for getting the ore and coal, the cost of labor, &c. Former experiments have proved as far as they have been made, that anthracite coal does better as the deoxidizing material than bituminous coal, and quite as well as charcoal, but the bituminous coal, is quite as good (though no better) as either for fuel to heat the ores."

It is stated that iron of the first quality can be made by it at Newark and sold in New York at $25 per ton.

City Railways.

There is one good and decided objection to railways in cities, viz., the difficulty which carriages and carts experience to turn out of the track, if by accident or otherwise they get into it. In fact it is scarcely possible to do so without crossing it at right angles, or nearly so. To obviate this difficulty Mr. T. Hyatt, No. 472 Greenwich street, this city, has invented a new rail, and new wheel to correspond with it, which is here presented.

A A are the rails, formed with inclines on the inside, and with the upper surface level with the street. The wheel has its tread, B C, made to correspond with the form of the rail; D is the axle of the wheel; E E is the track for the horses; it is lower than the rails to keep dirt from collecting on the inclines of them. Mr. Hyatt reasons thus:—that as high speeds are not necessary on city railways, the improvement to be made must be on the wheels and character of the rails, to remove all objections and render them acceptable to the public. He therefore dispenses with flanged wheels and uses broad rails. He also proposes broad wheels with a groove in the middle of the periphery of each wheel; and rails with a pro-projecting rib on each, as good substitutes for the flanges on the wheels. The grooves in the



wheels would not require to be deep, nor the ribs on the rails high, for a slow speed. A groove in the rail would not answer well, because it would fill up with dirt, &c., and its utility be destroyed. These improvements of Mr. Hyatt are worthy of attention, and will no doubt meet with the favor which they deserve.

Perpetual Motion Again.

A letter to the Journal of Commerce, New York, thus describes a new perpetual motion that has lately been invented by a Mr. Richter, of Madison Geo.:—

Within a glass case about the size of a common Yankee Clock, is held a brass wheel and its adjuncts composing the machine. The motive power is gravitation, operating upon weights thrown off from one side of the wheel. Leaden weights slide along the circumference of the wheel; to each of these is attached an arm, occupied with a brass bar, in such a manner as to throw out the bar with a brass weight attached to the extreme end, unfolding these bars in turn, much as if the hand that had been held drawn up to the shoulder, were thrown outward from the body by the straightening of the elbow joint, the extended clenched fist occupying the position of the brass weight. The brass weights carry their side of the wheel downward, and as each leaden weight, which had slidden forward and downward upon its passing the vertical point, passes the opposite point below, past which it is carried by the gravitation of the brass weights, it slides or falls back, and this movement in turn moves the inner end of the bar to which the brass weight is attached, in such a manner as to cause the weight to fold themselves up. This position they occupy within the circumference of the wheel until again the leaden weight passes the vertical joint, and they are in turn acted upon from the wheel as before. A cord passing around the shank of this lower motive wheel, is carried over a wheel above, carrying what may be called the escapement works of a clock with a pendulum. The pendulum, and the motive wheel below will continue its revolutions; stop the motive wheel below, and the pendulum above stops, showing that the motive power lies in the wheel with its weights below, and not in the works above. Loosen the cord that passes over the shank of the motive wheel below and carries the works above, and at once the motion of the large wheel below is accelerated, constantly increasing in speed with its own revolutions, and throwing off the weight with a rapidity and force that, unchecked, would cause the machine to tear itself into pieces. The inventor finds it necessary to keep the cord quite tight around the shank of the great wheel, in order to prevent his machine, when in motion, from destroying itself by the mere force of its own propelling power.

[We do not like to occupy much room with such a subject as the above, but it is necessary for us to notice such things in order "to point a moral." It is a law in mechanics that no machine can give out more power than it receives,—mathematically it gives out the same, but experimentally less;—friction is resistance, and this in time will arrest its motion. The perpetual motion mentioned above is apparently an old invention, and is described in Vol. 6 of the Franklin Journal, 1828. It is time that Perpetual Motion was obsolete with our newspapers.

Ice Houses.

As the time is at hand when ice is formed by nature, for the benefit of man, no farmer or any other person who can, should neglect to lay up a store for the summer use. It is so useful and economical, owing to its preserving qualities that no one who has butter or meat to preserve, or water to cool, should be without it. The cost of constructing an ice house, is small, and any person can do it. If possible, the ice house should be near or in the cellar.

A hole of the capacity desired, is first excavated in the bottom of the cellar from 5 to 6 feet deep, and the bottom covered with stones of a small size after the manner of paving streets. Over this, when completed, and the interstices filled with fine sand, is superinduced a stratum of boughs, either of hemlock, spruce, pine or fur, as may be most convenient. the sides are then to be lined with the same, as is also the top, which is formed by cross work, with an opening two or three feet square in the side or centre to subserve the purpose of a door. Into this depot the ice should be introduced in square cakes, of uniform size, in order that they may occupy less room. The whole process of constructing and filling, it will be seen, is very simple, and the expense, very light. A hole dug in the ground and covered with a flat roof of board over which is laid tarred cotton cloth, covered with some inches of sand makes a good ice house.

Ancient Patent Instrument for Church Sleepers.

It appears from Lewis' History of Linn, that in the early times of Massachusetts, it was the custom for a man to go about the meeting houses during divine service and wake the sleepers. He bore a long wand, at one end of which was a ball and on the other was a fox-tail. When he observed the men asleep, he rapped them on the head with the knob, and roused the slumbering sensibilities of the ladies by drawing the brush slightly across their faces—these were the days of rubs and snubs.

The Russian Scientific Academy has announced that, in obedience to the directions of the emperor, a committee has been appointed to report on the project of the French chemist, M. Archerot, for lighting St. Petersburgh with electricity. Experiments are to be made on a large scale in several parts of the city.

The corpse of Marlan, the celebrated balloonist, who recently crossed the Alps, from France, as noticed by us some time since, has been found on the Spanish coast. Ballooning is yet very unsafe, and this is the reason, we suppose, that no trip has yet been made to California.

No less than five steamers left the port of New York last week for California.

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Scientific American

NEW YORK, DECEMBER 29, 1849.

The Past and the Future.

Every man should live to some purpose. He should have some object to accomplish, distinctly and continually in view. Life is a voyage, and every man must navigate his own bark across its waters. Although millions of our race, since time began, have circumnavigated life's troubled ocean, yet the voyage to every individual, is in a great measure one of discovery. No one generation has gone through the same events exactly of another, and no individual the same as those of another. The phases of men's lives are like their countenances, each has something in it to point out its self-identity, and though similar it may be, still it is different from every other. It is, therefore, evidence of a skilful and careful life mariner to watch "the signs of the times," to examine regularly his chart—take his bearings, calculate his progress and lee-way and keep his vessel trim for storm, calm, or pleasant gale. Although the scientific navigator can take other observations than that of the sun's meridian, nevertheless he does not neglect to take his sextant when the sun approaches his zenith, to discover his true latitude. There are periods in every man's life, when like observations should be made, and one of those periods is approaching—it will arrive next week. The present year will then close, and a new one begin. There is no individual whose voyage of life is without adverse winds and many mistakes of reckoning committed. The past should therefore be frequently surveyed and the most wise preparations made for the future. No time, we believe, is more appropriate to take an extended survey of this kind, than on the first day of January, 1850—the third day of next week.

One year is a seventieth part of man's life, and how soon that portion of it passes,—the swiftly fled, now dream-like 1849, speaks to us with its "still small voice," "Whatsoever thy hands findeth to do, do with all thy might." It is the duty of every man to endeavor to leave the world better than he found it; therefore whatsoever he doeth, he should do well. Every man has his choice of action, good or bad, and in many cases, though not always, the choice of circumstances. There is no excuse, therefore, for doing wrong, and there is as little for not doing right. Although all men have the same voyage to perform, it is surprising to see how different from others, some perform it. Some seem to begin life without an aim, and end it without a purpose. No person will do this who takes our advice and takes frequent surveys of his voyage. It is a common thing at this time of the year for newspapers to make long rhyming addresses to their readers. If we struck our lyre in such a key, our readers, we suppose, would be suspecting that there was something wrong with our attic chamber. We endeavor to write to some purpose and for some object. We have in this article, as we frequently do, dwelt on some principles of moral science; such subjects come within the scope of our labor, although in a minor degree, as well as questions of physical science. Our object is to make men, *men*—to think better, and then they will be sure to act better—*to live to some purpose.* Young men, let your aims be high and your faith strong. Men of middle life, press onwards to the mark for the prize. Old men do not be weary in well doing, for in due season you shall reap if ye faint not.

A New Year's Present.

It is customary for friends at the Holidays to make presents to their friends. Some make presents of one thing and some of another. It is very common to make presents of books. We know of no kind of present equal to a good literary one: it bespeaks an elevation of mind, and a good will to do good, as well as to cause pleasure. It is common for fathers to make presents to their sons, and employers to their apprentices. Those who wish to encourage a scientific taste in their sons, or impart to their apprentices or workmen, mechanical knowledge—we believe could not do so more effectually than by making presents of bound Volume 4 of the Scientific American, or by subscriptions to Volume 5. All the newest scientific discoveries are found recorded in our columns, and all American inventions are regularly noticed every week, and many of them finely illustrated. Every bound volume contains at least 264 good wood engravings. There is no book that can be obtained for three times the price which contains as much useful information.

Manufacture of Sugar.

It has long been a desideratum with scientific sugar manufacturers, to discover some substance that would precipitate the sugar from the watery parts of cane juice, to obviate the tedious and expensive processes of boiling and purifying by charcoal, &c., and also to take up the whole per.centage of sugar crystaline in the juice. A recent discovery in Belgium is stated to have accomplished this object by employing a powder of the bi-sulphite of lime, but if this be a fact, some more information respecting its useful application, has yet to be made public, as recent experiments which have come to our knowledge, bring to light the fact that it is too injurious to the workmen ever to be employed on a large scale, and beside that, it is equally expensive with the lime and animal charcoal process. Above all the substances heretofore known, as a precipitant for impurities in natural sugar juices, are the subacetates of lead, which precipitates the general impurities from raw juices, rendering them comparatively colorless. This property of the acetate of lead has long been known to chemists, and successfully employed on a small scale, but every attempt to use them practically has been unsatisfactory, because of the difficulty in separating an excess of lead, which is poisonous. To separate the excess of lead, on a small scale, the bi-phosphate of lime has been successfully employed, but it is too expensive to use on a large scale.

To find out a cheap substitute for this purpose, was a grand object, and two years ago a patent was taken out in England by Mr. R. W. Seivier for removing all the metalllc salts that may be used in purifying by sulphurous acid. He therefore let in the gas from burning sulphur into the wooden vat, into which the coagulated juice was placed, and a force pump was used to force the gas into every part of the sugar solution. This process was not favorably received, because it was generally believed that the grain of the sugar, and its taste, were not so good as by the old processes. Strong hopes were at one time entertained, that voltaic electricity would afford a most simple means to deposit the metal, but at the last meeting of the British Association, Dr. Faraday expressed the opinion, that "it was impracticable,'.' Cane juice is a fluid of a very complex nature. In 1833 Mr. Avequin, of Louisiana, gave the first regular analysis of Java and Otahite cane grown in that State, and a Professor in the College of Havana, Cuba, published a chemical analysis in 1839. In the Report of Professors Bache and McCulloch, presented to Congress in 1847, we have perhaps the best treatise on the subject extant, but there is nothing in it to show that the purification of cane juice and the crystalization of sugar, is an easy or cheap process,—in short, the manufacture of sugar is a tedisome and expensive process.

With the exception of boiling in vacuo, we may say that the sugar manufacturer has not been benefitted in the least by the investigations of men named philosophers. The decolorising and purifying of sugar by charcoal was demonstrated by a practical workman, and the pneumatic cistern for carrying, and the filter of granulated charcoal were all the products of practical men.

We know of no vegetable product that has become so much an article of domestic consumption as sugar. In fact it has become part and parcel of every family's existence, and its consumption is always on the increase. Every improvement in its manufacture, therefore, is of great importance to the whole civilized world, but we hope that the civilized world will have sense enough to prefer the yellow grain, dark though it may be in color, to the whitest and most brilliant poisonous product of lead purification. A general article of food like sugar should be guarded with the utmost governmental care, from being contaminated with anything hurtful to the human constitution. Congress has passed laws to scrutinize the quality of foreign drugs—it was a good act, and so was the appointment of Prof. Bache to investigate the sugar manufacture of the United States, but there is something more to be done yet, and that is to watch and analyze our home products of sugar, to keep them purely healthy for use, and pursue the old plan of purification rather than to have sugars pure in color, by rendering them impure in quality by the use of lead in any shape. In some places, especially in South America, the manufacture of sugar is conducted upon a very barbarous system, and great improvements will, no doubt, yet be made both at home and abroad. These will be made by discoveries; some may be by accident—but it is by experiment that such things, generally, are found out. Every sugar planter should have a laboratory, and without being unwisely extravagant, should devote a portion of his time to investigation. It would soon become a pleasure, and a profitable one, in every sense of the word.

Iconographic Encyclopædia of Science, Literature and Art.

There are no works so expensive to publishers as encyclopedias, while none are so useful to the public. There are various encyclopedias in our country, and no public library of any consequence is void of the American or Edinburgh one, but taking all our people into consideration, there are but few families who have encyclopedias in their private libraries. It would be a good thing if every family was able to possess one,—we have often expressed this wish, and we are happy to say that it is about to be gratified. Mr. Rudolph Garrigue, of No. 2 Barelay street, this city, has commenced to publish the above work at $1 per monthly part, and to be completed in 25 parts—the whole cost, binding and all, will be about from $28 to $30. It is a translation from the German, the original of which we have seen. The plates in this one are from the original, the translation by Prof. Baird, of Carlisle College, Pa., makes the whole exceedingly clear. Three numbers of it has already been published, which treat on Mathematics in all its branches—trigonometry and geometry, &c. Mechanics in all its branches, with the description of many machines, new to thousands. Electricity, &c., is also embraced. Astronomy in all its branches, and Geography in all its branches, are also embraced in the parts published. There are twenty pages of plates and eighty pages of letter press in each part. The plates are all steel, and nothing equal to them has ever been published in any work in our country, nor could it be at four times the price. We have often admired many of the German works, they have a happy way of illustration which is at once entertaining and instructive, and this work is of such a character. The chapters are brief and clear, those on physics particularly, and the apparatus of Arago and Dulong, to test the law of Mariotte, is represented, and which is a curiosity to show the trouble and expense which those philosophers were at, to make correct investigations. The description of philosophical instruments is good and elaborate, and of itself is a masterly treatise. From time to time we will refer to *particulars*, as this is a work, which should be universal (because useful) property, subscribers are taken only for the whole work.

Notice.

Those who have apparatus for boring deep wells would find it to their advantage to advertise in the Scientific American. We make this statement for their benefit, because we have had many enquiries made about the price of such machinery.

Reviews.

We have a number of valuable works of a scientific character to notice, which we are compelled to leave over to another week.

By late advices there were £16,000,000 of bullion in the Bank of England.

The Woodworth Patent Planing Machine Case.

In notices heretofore published of the late case of Woodworth and Wilson against J. Brown at Baltimore, for the violation of the planing machine patent, it was stated that the practical operation of the verdict was "in favor of the defendant." We have received a communication which states that this "is not the case—that the suit is still to be held in chancery, when the effect of the verdicts, two for the plaintiff and one for defendant—will be the subject for further discussion, and from which hearing either party may appeal to the Supreme Court."

With regard to the decision in this case, we have not used a word of our own in comment. It is a case, as it now stands, of which we are not able to express any opinion—and as it is a principle of ours "nothing to extenuate, or aught to set down in malice," we forbear to say anything of our own upon the subject.

The President's Message.

After three week's inglorious struggling, the House of Representatives elected a Speaker, —Mr. Cobb, of Georgia, is the man, a Democrat. The Democrats have a majority in both Houses, and America sees the curious spectacle of a Whig President and Ministry, and a Democratic Congress. Mr. Cobb is a man of honor and ability—a good Speaker. The President's Message is a very good one. It was received in New York on Christmas Eve: it is not long. We perceive that our National Debt is only a little more than $64,000,000. Our foreign relations are rather singular, and want further developement. The country is yet safe —that's sure,

For the Scientific American.

Use of Lead in the Manufacture of Sugar.

GENTS.—I noticed in one of your late numbers that the United States had granted a patent for the use of Acetate of Lead in the refining of sugar. Can it be possible that the use of this virulent poison in a most important article of food is legalized by our Government? While on this subject will not you caution the sugar refiners against the use of white and red lead as a paint for their sugar moulds; when there are so many pigments that are perfectly harmless. They are inexcusable in placing carbonate and oxide of lead in a position to be dissolved by a hot solution of sugar, which, as a natural consequence of fermentation, has free acetic acid in it. I was told not long since by a sugar refiner, that he never knew any person to get the "Lead Cholic," from eating his sugar. I asked whether the men who painted his moulds were ever afflicted in that way; he replied "oh yes, frequently;" he acknowledged also that his moulds required re-painting after being a short time in use, but could not, or would not, understand that the paint which was missing, went down the throats of his customers. I have never used sugar of his make since. C.

Send me the Scientific American.

MESSRS. MUNN & CO.—GENTS.:—I was a subscriber to Volume 3, of the Scientific American, and had searched in vain to get one receipt which I particularly wanted. Not getting it, I dropped my subscription to Vol. 4. I lately purchased the receipt I wanted for $10. Last week I by accident came across a bound Volume 4, Scientific American, in the house of a friend, when, what should present itself on the very first page I looked, No. 52, but the very receipt (Marble Cement), for which I paid $10.

To be more wise in future, be pleased to to send me Vol. 4, bound, and accept my subscription for Vol. 5. Yours respectfully.

J. M.

Rochester, N Y., 19th Dec., 1849.

Niagara Falls a Mill Stream.

A flourishing mill has been erected at the suspension bridge over Niagara Falls, it is placed upon the bank of the river, at a perpendicular elevation of 250 feet above the water which propels it, and is connected therewith by a cast iron shaft 270 feet in length, running at an angle of 45 degrees.

It is said that branches of elder bushes scattered over grain heaps, will prevent rats from attacking the grain.

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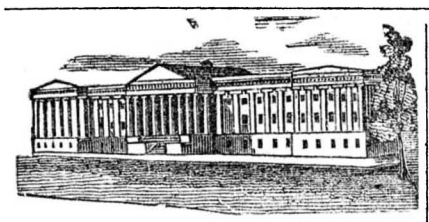

LIST OF PATENTS CLAIMS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending December 18, 1849.

To Thomas Blanchard, of Boston, Mass., for improvement in bending wood.

I do not claim as my invention the mechanical powers by which the operation of bending timber is effected—nor any particular form of machinery to carry my new method into operation, but the machine herein described is a form which I have adopted to carry out and combine my new method of bending timber, which is bending fibrous materials by means of the upsetting movements or the upsetting and relaxing movements combined, as exemplified in the screw, whether such movement or movements be produced by means of the screw, wedge, comb, lever, rack and pinions, or any other equivalent means.

To Robert M. Dempsey, of Indianapolis, Ind., for improvement in Bran Dusters.

What I claim is constructing the rotary scourer and operator with concentric roughened and reticulated prismatic rings; and hanging roughened or toothed prismatic rings—the latter being placed in the spaces between the former so as to leave concentric spaces between their inclined surfaces for the passage of the bran and flour over and around the ridges and sides of the aforesaid several prismatic rings in the manner and for the purpose herein fully set forth, by which the flour adhering to the bran, after leaving the ordinary bolts, is completely separated therefrom and saved, to be mixed with the superfine flour, or for any other purpose which the miller may desire—the flour passing through the wire bolting screws and out of the curb or case through the spout, whilst the bran is forced to the upper part of the curb and out of the spout, by the centrifugal action of the separator, aided by the blast of wind created by the rapid rotary motion of the said scourer and separator, as herein fully set forth.

To Peter Kirkham, of Waterbury, Conn., (Assignor to W. R. Hitchcock & Co., of Waterbury, Ct.) for improvement in the manufacture of Buttons.

I claim the new and useful improvement in the manufacture of buttons, of substituting a wooden mould for the common metalic shell that is stuffed with paper, and using the said wooden mould either for the top or bottom of the button, and covering the button entirely or only part of it, with some textile fabric or substance, and securing the shank and the covering inside, between the wooden mould and ring, or collet of the button, in the manner herein represented and described.

To Samuel Krauser, of Reading, Pa., for improvement in Clover Harvesters.

What I claim is maintaining the series of teeth at nearly the same angle with the ground at all heights to which they may be adjusted therefrom, in the manner herein set forth, and represented.

I also claim forming the fingers with a depression on their upper side above the knife, substantially in the manner and for the purpose herein set forth.

To Azel S. Lyman, of Upper Alton, Ill., for improved Alarm for indicating want of water in boilers.

I claim the introduction of the tube or box on the flue or other surface exposed to extra heat when water is too low, filled with water or other suitable liquid, for the purpose set forth.

To James M'Carty, of Reading, Pa., for combined lap and butt welded tube.

I do not claim either a butt-welded or lap-welded joint therein, as they are both old devices; but what I claim is a pipe composed of a combination of the butt-weld, with lap-welded end, as above particularly set forth.

To Isaac Merritt, of North West Bridgewater Mass., for improvements in Folding Gates.

What I claim is a single or double gate, constructed substantially as herein above described, so as to fold up horizontally in opening the same by degrees according to the width of opening required, without the necessity of moving the whole structure as when it swings on hinges horizontally in the arc of a circle, or vertically on a horizontal bolt, or pin, when folding, in the manner of a parallel ruler, my said improved gate moving horizontally over rails on wheels with great ease, whilst being contracted or expanded in opening or closing the gate, as herein fully set forth.

To Robert Patterson, of New Hartford, N. Y., for improvement in the manufacture of flax and hemp.

What I claim is the following process for preparing hemp and flax for spinning, viz., the treating of the lap after it comes from the "Spreading Frame," with an alkaline solution to soften the gluten of the flax, and washing it afterwards, as has been described, as a preparatory process for drawing it in the common drawing frames; and also drawing the flax lap in the common drawing frame, while the said flax lap is in a wet state, to draw out, separate the finer from the coarser fibres, and reducing the flax to its greatest possible fineness, making less tow, and running the machinery at a greater speed than by the dry process, and dispensing with the hatchel gill frame, substantially as herein set forth.

To Hugh Sangster, of Buffalo, N. Y., for improvement in Signal Lanterns.

What I claim is sub-dividing the front of the lantern into three divisions or sectors, and arranging and operating the colored glasses enclosed therein, in the manner herein described.

To Christian Sharps, of Washington, D. C., for improved method of revolving the hammer of repeating Fire-arms.

What we claim is the combination of the cocking and spring levers, with the double ratchet wheel on the revolving hammer substantially in the manner herein set forth.

To Henry Stanton, of Richfield, N. Y., for improvement in Churn Dashers.

What I claim is the combination of the perforated spiral float with the prismatic horizontal radial arm and vertical shaft arranged and operating substantially in the manner and for the purpose herein set forth.

To Henry Graham Thompson, of New York, N. Y., for improved valve-motion, cut-off and steam stops for rotary engines.

What I claim is first, the method of operating the steam stops or abutments, by a crank motion derived from the rotation of the piston-wheel, subtantially as described, when this is combined with the rotation piston wheel, the form of the peripery of which is such as would be generated by its rotation and the motions of the steam-stops, substantially as described, that the steam stops may always, in their motions, be in contact with the periphery of the piston wheel, and not operated by such periphery, as described.

Secondly, I claim making the ends of the steam stops with projections or toes that embrace the sides of the piston wheel, and extend within the periphery thereof, substantially as described, when this is combined with the grooves or recesses in the packing ring, or any equivalent substitute therefor, substantially as described, whereby the steam is prevented from passing from one side to the other of the pistons, through the grooves or recesses in which the ends of the stops slide, as described.

And Thirdly, I also claim in combination with the herein described method of operating the steam stops, the employment of cut-off valves, operated by eccentrics (or their equivalents) on the crank arbors that operate the steam stops, substantially as described.

To Isaac Winslow, of Philadelphia, Pa., for improvement in Bottle fasteners.

What I claim is the combination of the metallic caps with the tube constructed and used in the manner and for the purpose set forth.

To Andrew Wurfflein, of Philadelphia, Pa., for improved concealed hammer and turning nipple lock.

I do not lay an especial claim to the peculiarity of construction of the individual parts of this lock, as they may be varied in many ways, nor do I claim a concealed lock for exploding the cap inside of the stock; but what I claim is the combination of the lever with the nipple attached thereto, and sliding hammer, arranged and operated substantially as set forth, by which the nipple is turned and exposed to receive the percussion cap, and the hammer cocked simultaneously by the movement of the lever—the cap being exploded within a chamber inside the stock, in a peculiar manner as set forth in the foregoing specification, by which the inconvenience arising from flying fragments of the exploded cap and from smoke, at the moment of discharge, are avoided.

To Asa Broad, of Louisville Ky., for improvement in Machinery for Dressing Staves.

What I claim is the tilting plate placed in the front of the forward cutter in the head, in combination with the pin projecting from the beam of the supporting frame, for the purpose of throwing the shavings clear of the cutters, substantially in the manner herein set forth.

DESIGNS.

To Albert T. Dunham, John B. Coller and B. H. Sage, of Troy, N. Y., (Assignees of Wm. L. Sanderson,) for Design for Stoves.

To Wm. F. Shaw, of Suffolk Co., Mass., for Design for Girandoles.

RE-ISSUES.

To Edward Hall and Joseph L. Hall, of Cincinnati, Ohio, for improvement in Fire-proof Safes.

What we claim is joining the interior and exterior cases by the door frame; and connecting both cases with the insulating cement, by means of the anchors embedded therein, substantially as herein set forth.

We likewise claim the employment (in chests so joined) of hydraulic cement as the insulating substance for fire proof safes or chests, it being stronger when concreted than other cements heretofore used for the purpose, thus making a safe of superior strength and durability, especially when the same is constructed in the manner herein described.

To Francis S. Pease, of Buffalo, N. Y., for improvement in Harvesting Machines.

I do not claim to be the inventor of the turning alternating rake, and slotted double platform, but what I claim is alternating the rake and elevating and depressing its teeth by devices made, arranged and operated substantially as herein described.

I do not claim to be the inventor of a tight case for the back of the blade, to run in, nor of the slotted teeth to protect its edge, but what I claim is making a toothed blade case in uniform sections, each section having a tooth cast in one piece with it, the whole being attached to the rack bar by screws, or otherwise, in such manner that if the tooth, or if any section should get broken, it may be readily replaced by an extra one, cast in the same pattern, and kept on hand for that purpose, the rack thus made being equally efficient as a solid case, to protect the stock from dirt and obstructions, and can be more easily and cheaply repaired.

I also claim the manner in which the piston of the point of draught is changed by means of the slides and clamp screws, as herein set forth.

Carbonic Acid Gas.

A recent lecture delivered by Proff. Silliman, Jr., is thus described by the Louisville Journal:—

The subject of the lecture was "the form of bodies as effected by caloric." Having adverted to the well known fact, that water assumes the solid, the liquid, or the æriform condition according to the amount of caloric in it, the lecturer stated that the same law, probably, prevails among all bodies. Many gases which were formerly regarded as fixed in their æriform character have been reduced by chemical and mechanical forces to the state of liquids and solids. Carbonic acid is among the number. This gas, the professor demonstrated, is continually exhaled by the lungs in respiration. He collected a portion of it by breathing into a receiver, and on immersing a candle in it showed that the flame was extinguished. He then drew from a powerful cast-iron condenser a quantity of the same substance which, by cold and pressure, had been condensed into a liquid. This was held up before the audience in a thick glass tube and was seen as a limpid, colorless fluid, which might readily have been mistaken for water. By turning a key, the pressure was removed, and a portion of this liquified carbonic acid was allowed to return to the gaseous condition. The change was instantaneous; a part of the liquid flashed into vapor, and that which remained at the bottom of the tube was congealed into a mass resembling snow, having been frozen by its own evaporation. This experiment was exceedingly striking, and elicited from the audience strong expressions of admiration.

The learned lecturer next took up the apparatus in which carbonic acid is generated nnder great pressure, but, inasmuch as the experiment was not unattended with danger, he remarked that he presumed the audience would not insist on his generating the gas in their presence. He had put several charges of the acid into the condenser, which was surrounded by a freezing mixture. From the condenser he proceeded to draw off into a brass box the vapors of the acid, which, on being released from the immense pressure by which they were kept down—a pressure of thirty-eight atmospheres— were instantly condensed in carbonic snow. This snow was passed about among the audience on cotton in little boxes. When touched by the finger it excites the sensation of burning, and if kept for a few seconds on the skin produces blisters. The Professor placed a portion of it, mixed with sulphuric ether in a quantity of quicksilver, which, in a very short time, was frozen into a solid mass harder and heavier than lead. This part of the lecture created intense interest.

Prof. Silliman's style of lecturing is earnest, elevated, and impressive. His voice is fine, his enunciation is clear and distinct, and he has the air of being wholly absorbed in the questions of science before him.

American Pine Forest.

The grandeur of the pine grove is a sight worth seeing, 250 trees upon an acre of land, the lowest stem of which, before you came to a single branch, is 200 feet high. There is not a blade of grass growing at its foot, nor any brush or under wood whatever. You may walk among them without any obstruction for miles, and in the heat of the day and a cooling shade and shelter from the piercing rays of the sun, it appears as if you were in a half twilight, and not a rustle, beyond what your own foot makes upon the decayed leaves, strikes your ear; no birds of any kind can be seen, nor any squirrels, chitmunks, or rabits; all is still as death, and solitary as a desert island. But let a fire be kindled, and carried by the wind into the upper branches of these pines, and a sight will appear which would appal the stoutest heart; the fire leaps from tree to tree with the rapidity of lightning, and progresses as fast as the wind, nearly as fast as a horse can gallop. You will then see a canopy of fire on the tops of the forest and not a blaze below; indeed a man might run underneath, when, the fire is raging over his head and, if he took care to dash away the red ashes as they fall from the tops, he would take no harm, as long as the forest is unbroken, the flames advance, if it approaches a clearing, the utmost exertion of the people is taxed to keep it from their fences and buildings; for let it catch hold at one end and it will run along like a train of gunpowder, and everything upon the farm of a combustible nature will share the same fate; and well is it for the farmer if his wife and children are safe from its devouring influence.

To Preserve Smoked Hams.

The Southern Cultivator notices some hams exhibited in the Georgia State Fair which were one, two, three, and four years old. The writer says:

The owner refused to divulge his secret but as we have unfortunalely become possessed of it, we here give it. Procure some good, clean hickory ashes, have them perfectly dry; draw your meat from the pickle on a dry day; sprinkle the ashes over the meat pretty thick being careful not to knock off more salt than what must fall off; then hang up your meat as high as possible; smoke it with cool smoke, made by hickory wood; be sure to take it down before kipp er fly makes his appearanc, being generally in this climate the first of March; pack it away on a dry day in casks; first, a layer of hams in perfectly dry hickory ashes; second, a course of cobs, &c.; cover your cask snug and tight, and you may rest easy about your hams.

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TO CORRESPONDENTS.

"C. C., of Ind."—The drawings of your horse rake has been examined, there is nothing in the combination which would warrant you in applying for Letters Patent. The runners are the only new features presented, but no claim could be based upon them, as in this case it is only the application as a well known device to a new purpose. They are not however so good for this purpose intended as the wheels ordinarily used.

"T. H. J., of Mass."—Your question cannot be answered until we are made acquainted with your method of preparing the ivory. Glass has been used for such purposes, after receiving a coating chemically prepared. Ivory has not been used for the particular purpose, that we know of, but it may be that you prepared it in the same way, that the glass is before receiving the object.

"A. S., of N. Y."—Your plan for communicating power to the common dash churn is very simple and good, but very old. No patent could be obtained for it. $1 received and credited.

"N. L. M., of S. B."—The Institute referred to is defunct.

"E. C. J., of Mass."—We do not see what advantages you desire from the first plan presented for our consideration, or what particular use you inteud it for. The 2d is not new but constitutes one of the most ancient principles involved in the application of steam.—See Lardner or Stewart on the steam engine.

"G. N. C., of Ct."—We do not know what you use in mixing the British luster, if it is alum no patent can be obtained for the composition. This is all the information we can give from the very indifinite description given by you.

"L. C. B., of Vt."—The portable saw mill referred to is probably the invention of Mr. Geo. Page of Baltimore Md., who will give you any information in regard to price, &c., that may be required. $2 received and credited.

"S. H., of N. H."—The plan of your switch has been examined. We do not discover any thing new in it—a patent was granted last season to Mr. L. B. Wood of your state, for essentially the same devices.

"W. F., of Liverpool, N. S."—No work upon Practical Tanning can be obtained in this city, the want of it is seriously felt. Ranlett's Architect is the best work of the kind in this country, it treats more especially upon cottage and ornamental work. You would like this work, it can be furnished in two bound Vols., for $6 each, sent to our Halifax Agent. Please advise us.

"P. N. A., of Ind."—Your drafts have been received. and $70 paid to Mr. Chamberlain and the balance $100 credited as per request. Much obliged.

"E. R. B., of Wis."—Your model has arrived and will meet early attention.

"J. C., of N. Y."—The model of your "cut off" has been received, and the expenses paid to Express have been charged to your account. We cannot examine it until after the 1st of January.

D. L. G., of N. H,, & and A. B. of N. Y.—Shall attend to your cases, as soon as possible which will be about the first week in January.

"J. K. H., of Ala."—It is absolutely necessary that you furnish a good operating model of your invention and no steps can be taken towards making out the papers until a model is prepared. The Patent Laws, are explicit on that point.

"T. A. D., of Ind."—We shall be pleased to review your model of the "*Best Rotary Engine*" out, and would recommended you to forward it by Express immediately.

"H. T. P., of S. C."—A case of instruments were shipped to your address per Engineer of the steamer "Northerner" last Saturday.

W. F. of Ct."—Jesse Fox Esq., resided at Lowell, Mass., at the time he made his application for a patent on boilers (1832) but where he is at present, we know not.

"A. W., of Pa."—You could "get up" one of those "cattle feed steamers" for a much less price than it could be made here and then shipped to you. It is not patented in the United States but the right has been secured for Great Britain we think.

"H.G., of O."—Your plan for raising water is simply a well known law in Philosophy and operates by encouraging a small model but practical test has proven that it will not operate on an extended scale.

"J. W. B., of P."—We have seen no wheel constructed exactly like yours—the nearest to it is one in No. 38 of our last Vol.—we are doubtful about obtaining a patent for it. We do not think the planing machine, to which you refer, superior to one with rotary cutters, but better than many with stationary cutters.

"J. F. G., of Ohio."—Your plan of pumps is in common use in the English mines, but the assistance of the air is the same for one as for three—the spaces only make the difference. In regard to the screws, let it always be understood that there can be no gain of power without a decrease of speed,—an increase of power is a decrease of speed; an increase of speed is a decrease of power. This is a permanent law of mechanics.

"A. F. G., of Ga."—Your draft on Messrs. R. C. & Co., was duly received and promptly paid. Thanks for your promptness.

"H. J., of Ind."—Your model has been received and your business will be taken up in a few days.

"B. S., of N. Y."—Your specification and drawing was forwarded to you by Wells & Co.'s Express last Monday.

"C. W. B., of N. Y."—Your plan in principle is not new, but the construction is. In Vol. 2, Sci. Am., you will see a number of plans for this purpose.

Money received on account of Patent Office business, since Dec. 19, 1849 :—

D. J., of Mass., $20; W. P., of L. I., $20; N. P., of N. Y., $10; C. F., of N. H., $30; N. T. B., of Pa., $45; H. A. F., of O., $37; C. N. G., of Fla., $25; and F. S. T., of N. Y., $65.

A. L., of Me., T. G. U. F., of N. H., F. S. T., of N. O., H. A. D., of Ala., W. C. F., of Pa., and C. D. T., of N. Y.

Specifications of your inventions have been forwarded to you for signature, by mail, since Dec. 19th.

J. U. D., of Pa., S. & K., of O,; J. M. B., of Ga., F. S. T., of Pa., and C. D., of N. C.

Persons indicated by the above initials are informed that their funds were received and the Camera Lucida shipped according to their respective orders.

The six laboring days between Christmas and New Year's Day are considered holidays by most New Yorkers, therefore our friends and correspondents must not demur if their letters do not receive the early attention next week that they are accustomed to do, at our hands.

Back Volumes.

We are no longer able to supply Vols. 1, 2 and 3 of the Scientific American. We have on hand about 50 copies of the 4th, Volume bound, price $2,75, if any of our subscribers are intending to order a copy, they had better do so without delay.

ADVERTISEMENTS.

Patent Office.

128 Fulton St.

NOTICE TO INVENTORS.—Inventors and others requiring protection by United States Letters Patent, are informed that all business relating to the procuration of letters patent, or filing caveats, is transacted at the Scientific American Office, with the utmost economy and despatch. Drawings of all kinds executed on the most reasonable terms Messrs. Munn & Co. can be consulted at all times in regard to Patent business, at their office, and such advice rendered as will enable inventors to adopt the safest means for securing their rights.

MUNN & CO.,
128 Fulton street, New York.

ECCENTRIC & CONCENTRIC LATHE. We have on hand a few of Alcott's celebrated Eccentric and Concentric Lathes, which the inventor informs us will execute superior work at the following rates :—

Windsor Chairs, Legs and Pillars,	1000 per	11 hours.
Rods and Rounds - - -	2000 "	"
Hoe Handles, - - - -	800 "	"
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Among other features of our paper, worthy of note, may be mentioned the department for Farmers, in which origiual articles appear weekly from the best agricultural writers in New England; the Financial and Business department, under the direction of an accomplished financial writer; the Markets, which we report with more than usual fullness; the Shipping List, into which we condense with grear care, all marine intelligence of interest, to New England readers; the News Department, to which careful attention is devoted; besides which is given early intelligence of all new inventions, and discoveries, sketches of travel, historical, biographical and scientific articles, Sunday readings, puzzles, enigmas and problems, humorous sketches, and everything else that can benefit or interest the ordinary reader. The Illustrations will be continued weekly, and an entirely new field of embellishments will be entered upon.

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On Tanning Leather.—Preparation of Hides.

The art of preparing leather is very ancient, and is practised in every country on the face of the globe, with a general similarity of method, the result of obvious reasoning and long experience.

The objects fulfilled in converting skin into leather, are to prevent the destruction by putrefaction, which unprepared skin would undergo, and to render it strong, tough and durable, and in some instances impervious to moisture.

The skin stripped off an animal consists principally of the true cutis, or membraneous texture; the chemical composition of which is gelatin in a dense state, but still entirely soluble in water, more or less easily, according to its density. This however is penetrated with different vessels for blood, lymph, oil, &c., some of the contents of which remain after the death of the animal, and is covered on the outside with the insensible cuticle, to which is attached the exterior covering of hair, wool, fur and the like. The chemical composition of the cuticle and hairy covering appears to be condensed albumen, insoluble in water, and nearly incapable itself of putrefaction, but readily separable from the true skin by slight mechanical violence, after the adhesion has been weakened by incipient fermentation or putrefaction, or the chemical action of lime, alkalies, or acids.

The preliminary steps of all the processes for making leather consist in separating from the cutis, adhering impurities and foreign matters, the animal juices retained in its pores, and the cuticle with its hairy covering; (except when the latter is purposely left on.) The true skin being thus obtained nearly pure, and its texture so far opened as readily to imbibe any substance in which it is macerated, is then converted into leather in different methods, of which there are two quite distinct from each other; namely, that of tanning or impregnating it with the peculiar vegetable matter called tan; and tawing, in which it imbibes alum and other salts, and afterwards some soluble animal matter, such as the white of egg, or sometimes blood. These two processes are also sometimes combined, that is, first by tawing, and aftewards finishing with a slight tanning. A large portion of the tanned leather also undergoes the further operation of currying, or imbuing with oil of some kind, with much manual labor, in order to render it supple, flexible, and still more impenetrable by water. As familiar examples of each, the thick sole leather of shoes is tanned; the white kid leather, as it is called, for fine gloves, is tawed; the upper leather for boots and shoes, is tanned and curried; and the fine Turkey leather is tawed, and afterwards finished with a slight tanning.

All the skins undergo a considerable preparation before they are fit to receive the tanning solution. In most parts the process is the following, for the thin skins of cows, calves, and those that are used for the more flexible kinds of leather; most of which is afterwards finished by currying; the hide is first thrown into a pit with water alone, to free it from loose dirt, blood, and other impurities. After laying there for a day or two, it is placed upon a solid half cylinder of wood or stone, called a beam, where it is cleared of any adhering fat or flesh. It is then thrown into a pit containing lime and water, in which it is kept for several days, with frequent stirring. The use of this is to loosen the hair and cuticle; after which the hide is again stretched on the beam and the hair entirely scraped off with a blunt knife made for the purpose. In some tanneries the hair is loosened without the use of lime, the skins are piled together and covered with spent bark; in this situation a fermentation takes place, which so far decomposes the cuticle, as to allow the hair to be easily scraped off. Great care is required in its management, for if the fermentation is allowed to proceed too far, the texture of the skin will be injured. The length of time required for the completion of this process, varies with the weather and other circumstances; the pile is frequently examined, and the skins removed as soon as the hair is loosened. The hide being well freed from the lime, is then put into a pit called the mastering pit; which is a bath composed of water and the dung of some animal, generally hens, pigeons, dogs, or, when it can be had, of sea-fowl, diffused through the water. The dung of horses or cows will not answer, not being sufficiently putrescent. Here the hide remains for some days, more or less, according to its texture; and from being hard and thick it becomes very soft and supple.—Where the hide is very thin and fine, extreme care is requisite in regulating this part of the process; for the putrescent dung is found so powerful an agent, that if the skin is kept in it only a few hours too long its texture is irrecoverably destroyed, and it is reduced to a gelatinous mass, which pulls to pieces with the slightest force. The hide is then thoroughly cleaned on the beam, and is fit for tanning.

The large thick ox hides, intended for the toughest sole leather, or where a very strong leather is required, are prepared in a different way. Being first cleaned in water, they are rolled up in heaps, and put into a warm place, where they speedily begin to putrify. The hair is then loosened, and may be scraped off sometimes with, and at other times without, the process of liming. The reason why the liming is generally omitted is, that the lime, if retained in the skin, renders it too hard and liable to crack; and it is not so easy to wash it out from these, as from the thinner hides. But on account of the thickness of the hide, and the closeness of its texture, it is not fitted to receive the tan liquor till its pores are more completely opened; and this is usually done by immersing it for several days in a vat containing a sour liquor, an impure acetous acid, formed from rye or barley flour, strongly fermented. The acid generated in the process, seems to be a principal agent in opening the texture of the skin; but this is, doubtless, assisted by the continuance of the fermentation, of which the skin itself partakes. This process is called raising, and it always immediately precedes that of tanning. Here, also, much care is required not to weaken the texture of the skin too much, for if kept too long in this process, it would be corroded and spoiled. The hide comes out of this bath considerably swelled and softened.

Instead of this part of the process, which is often difficult to manage properly, on account of the effect of the weather, and other external causes, on the necessary fermentation; sulphuric acid, extremely diluted, may be used. The proportions employed, are about a wine pint of oil of vitriol to fifty gallons of water. Though the vitriolic bath is found to have as good an effect as the rye and barley sourings, in preparing the hide for the tan, the action of the two substances seems to be considerably different. In the latter the acetous acid is doubtless the chief agent, but the fermentation still continues, as is proved by the readiness with which the skins are rotted, if this is too high or too long continued. The skin also, after raising in this way, is thickened and softened. But the vitriolic bath is incompatible with any fermentation, and most powerfully checks this process, and hence the skin is not readily spoiled by very long immersion, and it comes out thickened and hardened. It should seem, however, that each method answers perfectly well.

NOTE—We intend to publish a series of articles on this most important (and always will be important) art, so as to present all that is useful and new to our readers, and which taken altogether, will form the best essays on the subject ever published.

The Cumberland (Md.) Civilian says that there exists in the vicinity of that place an inexhaustible supply of sand for the manufacture of glass, that is not surpassed, in every essential quality, by any to be found in the United States.

Another great sale of Camel's hair shawls took place in this city on the 21st instant.—The lowest price was fifteen dollars—the highest $550.

History of Propellers and Steam Navigation.

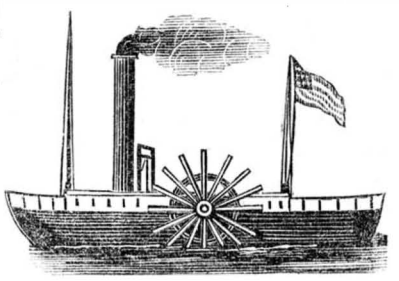
[Continued from page 112.]

OLIVER, EVANS, COL. STEVENSON, ROBERT FULTON.

It is stated that Oliver Evans published, in 1785, an account of a mode to propel vessels with paddle wheels, by his high pressure engines, and although Galloway states that he believes that "he fully establishes his claim to the first practical steamboat," still we have no correct evidence to establish the truth of this statement. Neither Rumsey nor Fitch mentions his claims in their pamphlets, nor have we any evidence that he ever built a boat except his *Orukter Amphibolis* or Mud Scraper; but he was a most ingenious man.

In 1804, Mr. Stevens, of Hoboken, N. Y., made a number of trips on the North River with a small boat 25 feet long, which was propelled by a wheel at the stern. Mr. Stevens first tried a rotary engine, but it would not answer, and then he tried one like Watt's, which propelled his boat at the rate of four miles an hour, and it even run at the rate of eight miles per hour for a short distance. Stevens rendered an important service to the engineering world, by his invention of the tubular boiler, which he patented, and which, as a suggestion at least, has been the means of working wonders, for in a boiler 6 feet long, 4 feet wide, and 2 feet deep, he exposed 400 feet of surface in the most advantageous manner to the action of the fire.

FIG. 10.—THE CLAREMONT.



While Fitch, Oliver Evans and John Stevens, were prosecuting their experiments in steam engines and steamboats in America, Robert Fulton was in Europe studying and experimenting on the same subject. He left Philadelphia in 1786 and went to London, and in 1793 he communicated with the Earl of Stanhope about steamboats, and he published a very neat work on the subject in 1796. The Earl of Stanhope was a very ingenious nobleman, and proposed to propel the boat by what was called the Duck-foot propeller, which was simply a kind of a broad blade that opened when acting against the water—it being pushed behind the boat on a rod or foot, and closed by the action of the water when drawn back. In this same year Fulton went to France, where he brought the subject before the French Directory, and the Minister of Marine. He also proposed to build his Nautilus to "deliver France and the whole world from British oppression." In 1801 he tried his Nautilus at Brest, under the favor of Napoleon, and remained under water for four hours and a half, but he never blew up a single enemy's ship.

It was in France, where Fulton was introduced to Mr. Livingston, his countryman, who in 1803 assisted Fulton to complete a boat 66 feet long, to be propelled with paddle wheels, on the Seine. From the number of experiments which Fulton had made before, we believe, that Mr. Livingston, in all likelihood, made some good suggestions to him in the building of this boat, for this experiment fully established the confidence of both the projectors, and they at once ordered an engine to be built by Bolton & Watt, in England, to be forwarded to New York, to introduce the steamboat on American waters. Livingston succeeded in getting a patent from New York to navigate all its waters by steam for twenty years. Fulton arrived in New York in Dec., 1806, and in 1807 his steamboat, the Clermont, was launched on the East River, and although in the course of its erection it was called "Fulton's Folly," and he was looked upon as a man beside himself, yet his vessel had not proceeded one hundred yards from the shore before the incredulous multitude who had assembled to witness its failure, were convinced of its utility, and from them were extorted renewed cheers. This vessel made regular trips to Albany, and it may be said that from the first stroke of her paddles, steam navigation has never ceased for a single day. She established regular steam navigation. She made her first trip to Albany in 32 hours, being at the rate of five miles per hour. The Clermont was 160 tons. The cylinder was 24 inches in diameter and 4 feet stroke.

Some have endeavored to tarnish the fame of Fulton, by endeavoring to rob him of all honor or merit; but he deserves great praise, and his memory will always be respected by every impartial person who looks back upon the works which he accomplished. Until the period of the Clermont's first trial, we have seen that the subject of steam navigation had been brought before the public, at various periods, in different parts of the world, from 1736. The advancements made in the art may be said to have been gradual, one inventor profiting by the failures of his predecessor, and surely we must give credit to that sagacity that perceives how to remedy a defect. Until James Watt improved the steam engine, and made it double acting, no steamboat was successful, and when we consider that he built the engine of the Clermont—the first successful boat—we cannot shut our eyes to his merits in connection with improvements in steam navigation.

It very often happens that a good idea is embraced in a new invention—a new principle of action developed; but it also often happens that there is some great fault in carrying it into execution; we are, somehow or other, very liable to make blunders, and only get our wisdom in a negative manner, by dear bought experience; and in the case of steam navigation let the *honest* historian state facts in such a manner as not to adorn the character of one inventor at the expense of another.

LITERARY NOTICES.

SOUTHERN CULTIVATOR.—This is a valuable monthly agricultural periodical, published at Augusta, Ga.; D. Lee, M. D., Editor. It is well conducted and ably edited.

THE PRAIRIE FARMER—Published by Messrs. J. S. and J. A. Wright, of Chicago, Ill., commences its new volume on the first of next month. It is a truly useful Magazine for our Western farmers.

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